form the results of studies of the fresh excreta of forty cholera patients and of the cadavers of fifty two recent victims, offer an interesting and doubtless valuable contribution to the subject under discussion, but by no means demonstrate that the active principle of cholera resides in a microbion, or that the particular microbion has been discovered.

Notwithstanding the labours and advances in this direction during the last ten or twelve years, the number of diseases in regard to which a positive affirmation can be made that they are caused by a micro-organism, and by a specific micro-organism, is still very small, and neither cholera nor typhoid fever can as yet be included in that number. The number in regard to which there is only a strong probability that they result from a specific germ, propagating amid favorable surroundings, and finding entrance to the system of the victim under favorable circumstances, is much larger, and must still be regarded as embracing cholera.

The investigations of the German commission will probably be continued under the auspices of the German health bureau at Berlin, or otherwise; and the British government has at last appointed a commission consisting of Drs. Klein and Heneage Gibbes, to go to India and pursue this inquiry as to the nature of cholera; so that a further elucidation of the subject and of the precise significance of Koch's observations, may reasonably be anticipated at no distant day. In the mean time it is our duty to protest against a confident application to the disease itself of measures of prophylaxis, of treatment, of disinfection, or of quarantine, based upon the life-history of the *comma-tipped bacillus*, or upon its behavior when subjected to the action of certain media or of certain germicides.

Although their specific microbions have not been definitely demonstrated, experience and observation have fairly established the probable accuracy of certain views in regard to both typhoid fever and cholera; and upon these the measures to be adopted against such maladies are at present to be based. They are clearly and concisely set forth in a circular entitled "Suggestions relative to epidemic cholera," lately issued by the Massachusetts board of health, itself following generally a previous circular emanating a year ago last June from the English local government board, and reprinted under the same authority, with other supporting papers, last July.—*Science.*

Scientific Notes.

Temperature of the Spheroidal State.—Prof. Louis Bell, of Dartmouth College, communicates to *Science* the particulars of some experiments which he has recently made to determine the temperature of the spheroidal state of liquids. The experiments were very carefully conducted and were simple in manner. The spheroids of the liquids experimented upon were produced in a spoon heated over a spirit lamp. A large number of experiments were made, the average variation of which did not exceed 1°. The size of the spheroids had no effect upon the temperature. The temperature thus found was: for water, 90°, and for alcohol 69°. We are not aware that any effort had previously been made to determine such temperature. The results of Prof. Bell's experiments show a much lower temperature than has hitherto been assigned to the spheroidal state, and they are both interesting and important.

Effect of Case-Hardening on Iron.—Among some master mechanics and locomotive builders there exists a strong prejudice in favor of using case-hardened pins, yet pins of this kind fail oftener than any other part of a first class locomotive. Some time ago the Baldwin people becoming convinced that case-hardened pins were unreliable, they determined to make some systematic tests to prove the matter beyond peradventure. The took a bar of 2 inch iron and cut it into lengths of 12 inches. One piece they kept out and the others they put in the case-hardening furnace. After being an hour in the furnace one piece was taken out, and another after it had been two hours in, and so on till the five pieces had gone through the case-hardening operation, the last piece taken out having been in five hours. All the pieces were then in succession subjected to a breaking strain, when it was found they had decreased in strength in proportion to the time they had been in the furnace. Examination showed that the case-hardening process did not merely affect the outside of the iron, it went to the centre. In the piece that had been in longest, the heart had become crystaline, and very coarse. All the others showed similar indications in small degrees according to the time they had been in the furnace. In the breaking tests, the pieces that had not been in the furnace doubled without breaking, but all the others snapped off.

Mineral Formations.—By an ingenious artificial contrivance, chemists in France and Germany have succeeded in imitating the conditions which are supposed to exist in nature and have produced crystals of native copper, and red oxides of copper, and of various oxides and sulphurets like those which are deposited in the mineral veins. These results explain several hitherto irreconcilable facts in the phenomena of mines. Native sulphides, if brought in contact with metallic solutions, effect the reduction of the dissolved metal. Galena if placed in a solution of auric chloride, becomes gilded, Mercury is also precipitated under the same conditions. These facts indicate certain geological consequences, particularly as regards the combinations to be found in metallic veins. We have convincing proof that long ago, when the waters covered the face of the earth, the influence of electricity (in producing crystals and entire veins of metallic bodies in their rocky repositories) was felt and that when the convulsions of nature forced the waters to recede and evaporate, the metals which were then held in a state of solution, were precipitated and thus quartz leads were formed. The action of electricity, by which heat is produced, is the grand principle which creates and sustains both animal and vegetable life and by which the earth was formed—this same agent is the origin of not only base metal ores, but of all ores containg gold and silver in their native state.

A New Means of Producing Light.—Professor Matthew Williams, writing in the *Gentleman's Magazine*, says:—I now learn that Professor Radziszewski has actually separated the luminous matter of the *Pelagia noctiluca*, one of the multitude of species of marine animals that appear like little lumps of jelly, and produce the phosphorescence of the sea. . . . I have collected and examined a great variety of these animals at different times; the most remarkable occasion being one morning after a magnificent display of marine luminosity in the Mediterranean, a few miles off the shores of Algiers. The surface of the sea was encrusted, I might almost say, with countless millions of small jelly-like creatures, spherical, ovoid, oblong, dumb-bell, and other shapes, varying in size from a mustard-seed to a pea; a bucketful of water taken over the ship's side appeared like sago broth. They were all internally dotted with a multitude of what I suppose to be germs, that would be liberated on the death and decay of the parent. The practical importance which I attach to the study of the luminosity of these creatures is the fact that they supply light without heat. The costliness of all our present methods of artificial illumination is due to the fact that we waste a largely disproportionate amount of energy in producing heat as well as light.

Protecting Steel and Iron from Rust.—Professor Calvert has recently made the interesting discovery by practical tests, that the carbonates of potash and soda possess the same property of protecting iron and steel from rust as do those alkalies in a caustic state. Thus it is found that, if an iron blade be immersed in a solution of either of the above carbonates, it exercises so protective an action that that portion of the iron which is exposed to the influence of the damp atmospheric air does not oxidize, even after so extended a period as two years. Similar results, it appears, have also been obtained with sea water, on adding to the same the carbonates of potash and soda in suitable proportion.

Disinfecting the Sick Chamber.—Dr. Vilandt recommends that the atmosphere of a sick chamber where the patient is ill of diphtheria, measles, scarlet fever, or any allied disease, should be impregnated with the odor of a mixture of equal parts of turpentine and carbolic acid. Half a teaspoonful of the mixture will be enough at a time, if it is put into a kettle of water kept near the boiling point. The odor generally gives some relief to the sufferer, and tends to prevent the spread of the malady. A disinfecting lamp can also be advantageously used and may be easily prepared for purifying any place where a disagreeable odor is perceived, being especially useful in sick rooms and in damp cellars where vegetables have decayed. Take any glass lamp for burning kerosene or oil, fill it chloric ether and light. The old-fashioned camphene or burning fluid lamps, with a small, round wick, will burn longer and be of more service than the flat-wicked lamps. While the ether burns, a disinfectant escapes that will soon purify the most offensive atmosphere, even that of a sewer.